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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/708,085	11/08/2000	Nobuhiro Jiwari	0819-450	9875

22204 7590 11/28/2003  
NIXON PEABODY, LLP  
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EXAMINER

NGUYEN, THANH T

ART UNIT PAPER NUMBER

2813

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/708,085

Applicant(s)

JIWARI ET AL.

Examiner

Thanh T. Nguyen

Art Unit

2813

AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-7 and 9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-7 and 9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 9/17/03 have been fully considered but they are not persuasive.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-7, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akahori et al. (U.S. Patent No. 6,218,299) in view of Homma et al. (U.S. Patent No. 5,420,075).

Akahori et al. substantially discloses a method of forming a semiconductor device which includes: forming metal line (14, fig. 7a+), depositing an interlayer insulating film (13a) made of fluorine-containing organic film between the metal lines (14) using a material gas containing fluorocarbon as a main component in a reactor chamber of plasma processing apparatus, (col. 4, lines 30+, col. 6, lines 50+), wherein the fluorocarbon is  $C_nF_m$ , where n, m are an integer (see col. 7, lines 40-46), therefore, it is obvious that it includes:  $C_5F_8$ ,  $C_4F_6$ , or  $C_4F_6$ , after the depositing step, densifying the fluorine-containing organic film by exposing the plasma of rare

Art Unit: 2813

gas Ar including no fluorocarbon thereby heating the fluorine-containing organic film in the same reactor chamber (col. 7, lines 20+, as claimed in claims 3, 5, 9).

With regarding to the limitation densifying the fluorine-containing organic film by exposing the plasma of rare gas after the deposition step. Absent a showing of unexpected result, a change in sequence involves routine optimization of process of prior art and would have been obvious to one skilled in the art at the time the invention was made. A change in sequence/reversal of process steps is obvious under 35 USC 103 (ex parte Rubin, 128 USPQ 440 (Bd. App. 1959)). See also in re Burhans, 154 F.2d 690,69 USPQ 330 (CCPA).

However, the reference does not teach photoresist patterning the metal lines (as cited in claims 6-7).

Homma et al. discloses a method of forming a semiconductor device, which includes: forming metal lines (3, 4, 5) by known patterning methods such as with a photoresist masking and etching the conductive metal with plasma reactive ion etching (col. 4, lines 1+, called dry etch), filling the gap between the metal lines with insulating layer (7).

Therefore, it would have been obvious to one of ordinary skill in the requisite art at the time the invention was made to modify Akahori's process of forming metal lines (14) with photoresist patterning and etching the metal with plasma etching to form metal lines as suggested by Homma because the technique of photoresist patterning to form metal line is well known in the art.

***Response to Arguments***

Applicant's arguments filed 9/17/03 have been fully considered but they are not persuasive.

Applicant contends that the prior art taught or suggested the limitation densifying the fluorine-containing organic film by exposing the plasma of rare gas after the deposition step. In response to applicant that absent a showing of unexpected result, a change in sequence involves routine optimization of process of prior art and would have been obvious to one skilled in the art at the time the invention was made. A change in sequence/reversal of process steps is obvious under 35 USC 103 (ex parte Rubin, 128 USPQ 440 (Bd. App. 1959)). See also in re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (703) 308-9439, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:00AM to 3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on (703) 308-4940. The fax phone number for this Group is (703) 308-7722.

Art Unit: 2813

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (See **MPEP 203.08**).

A handwritten signature in black ink, appearing to read 'Thanh', with a long horizontal stroke extending to the left.

Thanh Nguyen  
Patent Examiner  
Patent Examining Group 2800

TTN